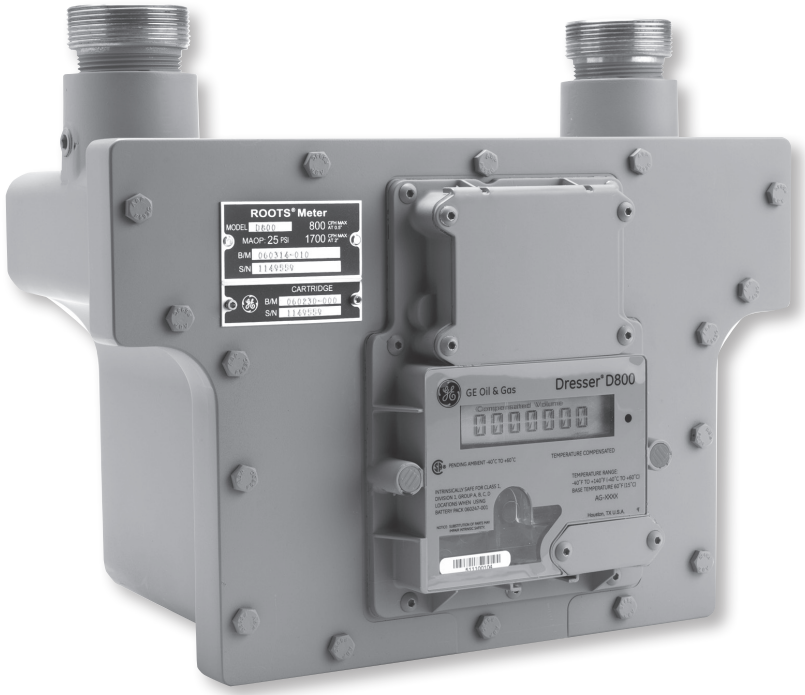
GE Oil & Gas

Dresser* D800 Meter

Installation Supplement



imagination at work

Dresser D800 Meter Installation Manual

1. Receiving, Handling and Storage

At Time of Delivery

1. Check the packing list to account for all items received
2. Inspect each item for damage
3. Record any visible damage or shortages on the delivery record
   a. File a claim with the carrier if necessary
   b. Notify your Roots Meter supplier immediately

Do not accept any shipment that has evidence of mishandling in transit without making an immediate inspection of package for damage. If shipped as part of a meter assembly, the meter should be checked for free rotation soon after arrival as damage to internal working parts can exist without obvious external evidence.

Should any serious problems be encountered during installation or initial operation of the meter, notify your ROOTS® meter supplier immediately.

Do not attempt repairs or adjustments, as doing so may be a basis for voiding all claims for warranty.

When reporting a suspected problem, please provide the following information:

- Your Purchase Order Number and/or Dresser's Sales Order Number
- The Product Model, Serial Number and Bill of Material Number
- A Description of the problem
- Application information, such as gas type, pressure, temperature, and flow characteristics

Our Product Services Department offers professional services for all ROOTS® products. Authorization for return is required for all products shipped to the Factory for repair, calibration, warranty, exchange or credit. To obtain authorization an RMA number for return of ROOTS® products must be issued. Please contact your ROOTS® meter supplier. All returns should be packaged in an original-type shipping container if available or shipping material that will protect the product.

Storage/Initial Testing

If the product is not tested or installed soon after receipt, store in a dry location in the original shipping container for protection.

2. Use and Limitations

This document provides recommendations where there is no established company procedure or practice.

ROOTS® Meters are designed for continuously measuring and indicating accurate measurement of clean, dry natural gas and other non-corrosive gases at constant or varying flow rates. The Dresser D800 Meter has superior rangeability to most small commercial meters and is capable of measuring small pilot loads. Contact your ROOTS® meter supplier for a list of approved gases or additional performance details.

The temperature operating range is from -40°F to +140°F (-40°C to +60°C).

WARNING

This equipment is designed to operate at temperatures between -40° F to 140° F. Prior to going on-site for installation or maintenance, make sure proper safety equipment is worn before handling the equipment and that you are properly dressed for the work site environment temperatures.

WARNING

Beware of sharp surfaces and potential pinch points while performing installation, maintenance and repair procedures. Utilize proper personal protective equipment or protective procedures wherever hazards exist.

3. Recommended Communication Interface

Infrared (IR) Communications Kit
(Purchased separately)

- IR Sensor (USB connection)
- Holder – IR Assembly
- USB cable
- Magnet
- Dresser MeterWare Software

4. Meter Display

Scrolling through the different screens on the LCD display requires the use of a magnet. The magnet can be purchased in the Communications Kit, P/N 060542-000, or as an individual item, P/N 060541-000. Consult Factory for pricing. The Dresser MeterWare software is also available as a separate item.

Swipe the magnet across the black dot, which is to the right of the LCD display screen, as shown in Figures 4.1 - 4. 2.

Note: The magnet will not change the screen if swiped on another area of the label.

Figure 4.1. - Label on D800 Meter

Figure 4.2 - Swipe magnet across the black dot to change the screens.

4.1 LCD Screen Displays

1. The default screen is either **Compensated Volume** or **Non-Compensated Volume**, depending on customer configuration.
   a. This parameter is the home/default screen.
   b. After a time out of approximately 30 seconds, the home screen always will appear.
2. Repeat the swiping motion of the magnet across the black dot, and additional screens will appear. Three to five seconds after the name of the value or the parameter appears, the screen will switch to show you the value of the selected parameter.

   The information displayed is user selectable. For more information on the Screen Display and the information displayed, refer to the D800 Installation, Operation & Maintenance Manual or the MeterWare Software Manual.

4.2 RPM Wheel

A black & white RPM wheel is located under the plastic cover just below the index. The reflective RPM wheel is used to verify impeller rotation which means that gas is flowing, as well as when using an optical photo-sensor (scanner) when testing the meter for accuracy on a proving device. Each revolution of the RPM wheel indicates 0.007407 cf (0.0002098 m^3) of non-compensated gas flow through the meter.

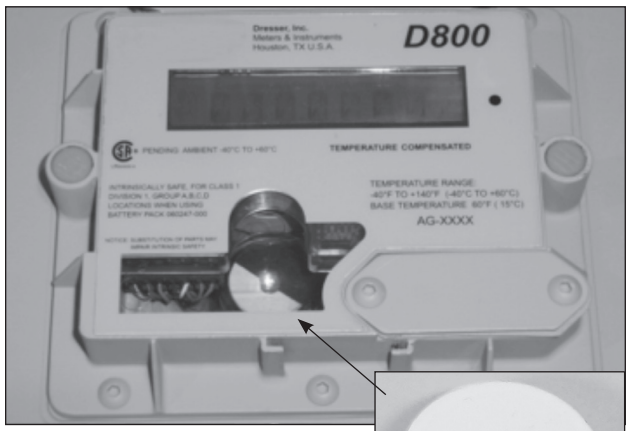
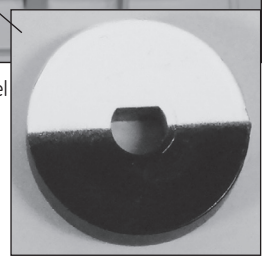


Figure 4.3 - Movement of the RPM wheel indicates impeller rotation



RPM Wheel

5. Installation Procedures

5.1 Meter Installation Recommendations

WARNING

If equipment is installed/serviced/maintained at elevated heights, ensure proper safe site work practices are in place to prevent fall and drop hazards.

WARNING

For installations in confined spaces, allow adequate room to safely handle product and equipment without causing bodily strain. Also verify proper ventilation is in place to maintain a breathable atmosphere.

Important: Prior to installation view the meter nameplate and ensure the Maximum Allowable Operating Pressure (MAOP) and rated capacity for flow rate meets the installation requirements.

Follow your company guidelines and industry accepted practices.

- In areas of reduced meter visibility, such as meter locations next to parking lots or where the meter is potentially covered by snow, ensure protective devices are in place to prevent damage from automobiles or other large moving vehicles or equipment.
- Prevent debris and moisture from entering the meter to avoid possible damage and restriction of gas flow. As with all rotary meters, a strainer or filter upstream of the meter may be used to help remove contaminants such as pipe sealant, tape and weld slag from the gas stream.
- Piping should be rigid, properly aligned and level. The D800 meter does not require any direct means of support, but the piping on either side should be supported to eliminate any unnecessary piping strains on the meter housing.
- Since the meter is supported entirely by the gas pipe line, movement of the piping due to accidents, settling of the ground or other causes may impede meter operation and accuracy. Make sure the meter remains level within 1/16" per foot in any direction.
- If the potential exists for over-speed conditions, a restricting flow orifice plate should be installed 2 to 4 pipe diameters downstream of the meter outlet. Warranty does not cover meter failure due to over-speed conditions.
- Protect the meter from snow loading. This includes mechanisms to protect against mechanical strain associated with excessive snow build-up or snow/ice falling from elevated locations such as rooftops.
- Take extra precautions when working in icy or slippery conditions to ensure proper footing and to maintain control of the meter.

5.2 Placing Meter in Line – Before Start Up

1. To prevent damage to the meter, make sure the upstream piping is clean of scale, dirt, liquids and other debris by purging the gas line. This is often done by venting the line to the atmosphere.

WARNING

Follow your company's procedures for venting gas into the atmosphere as performing this task can create a hazardous environment.

2. Remove the protective caps from the threaded male inlet and outlet fittings (e.g., ferrule or spud) by turning counter-clockwise. To prevent small slivers of plastic from falling into the meter or damaging the spud threads, do not pull or pry the cover from the ferrules.
3. Place a new meter mount swivel washer (gasket) on each swivel nut as shown in Figure 5.1. Ensure the washer is properly installed or the swivels will not seal properly against the meter ferrules (spuds).

Figure 5.1 - Proper installation of washer into swivel

4. Connect the swivel nut on the gas supply side of the line to the meter ferrule (spud) as shown in Figure 5.2. Ensure gas flow is in the same direction as configured on the meter index. Hand tighten the nut to the meter ferrule.

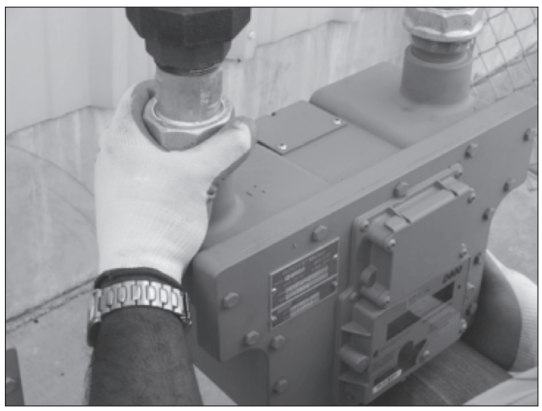


Figure 5.2 - Connect meter ferrule into swivel nut on the gas supply side

5. Connect meter outlet to the downstream side of the line as shown in Figure 5.3. Hand tighten the nut to the meter spud.

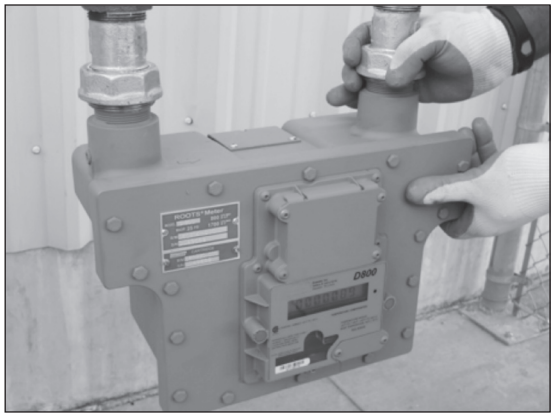


Figure 5.3 -Connect meter outlet to swivel nut on the downstream side

6. In a correct installation, the meter index is parallel to the ground with both meter ferrules (spuds) pointing upward. Refer to Figure 5.4.

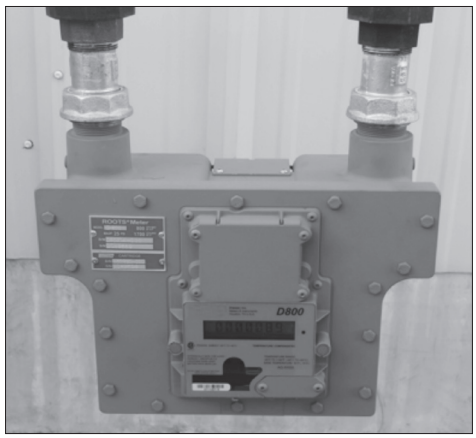


Figure 5.4 -Meter placed in line

7. Ensure the meter is installed without piping strain. Level the meter to within 1/16" per running foot.
8. Use a pipe wrench to tighten the nuts to the meter ferrules as shown in Figure 5.5. There is no torque value for swivels. Proper compression is dependent upon the thickness of the swivel seal (gasket). Tighten until the seal is properly compressed and there are no leaks.

WARNING

Due to the nature of this fastener, no torque value is stated. However under torquing or over-torquing may result in gas leakage due to improper sealing or damage to the meter pressure vessel. Perform a leak test as specified below.

Figure 5.5 - Use a pipe wrench to tighten swivel nuts

9. Before turning on the gas, verify the downstream valve is closed if one is present. Verify all connections have been tightened to the appropriate torque.
10. A Leak Test must be performed immediately after placing in service. Refer to procedures, in Section 5.4. All leak points must be eliminated quickly and before leaving the meter site. Otherwise, remove the meter from service by placing on by-pass or other method.

5.3 Meter Start-Up

5.3.1 Meter Start-Up for Meter Sets Without a By-Pass

1. Very slowly, open the meter inlet valve just enough to allow gas into the meter. This will allow the meter to pressurize. The RPM Wheel may start to rotate during this process.

   Important: Do not exceed 5 psig/second maximum when pressurizing the meter. Rapid pressurization can cause an over-speed condition which may damage the meter. Resulting damage is not covered by warranty.
2. After the meter is pressurized, follow your company's authorized procedures or common industry practices to leak test the meter and all pipe connections. Soapy water, Snoop® or gas analyzers are commonly used for this procedure. The D800 also incorporates a leak test feature as described in Section 5.4.
3. If a leak is detected, turn the gas off by slowly closing the meter inlet valve (and if present, the meter outlet valve). Make the necessary adjustments to stop the leakage and repeat the meter start-up procedure. If no leaks are detected, continue the start-up procedure.

WARNING

Before making adjustments or working on the meter, slowly depressurize and vent all pressure from the meter set in accordance to company procedures or industry guidelines.

4. If a downstream valve is present, slowly open the downstream gas valve.
5. Ensure gas is flowing through the meter. Let the meter operate at low speed for several minutes. Movement of the RPM Wheel indicates impeller rotation. Listen closely for unusual scraping or knocking sounds. If unusual sounds are present or the RPM Wheel is not turning, shut off the gas flow to the meter as described above. After making the necessary adjustments, repeat the meter start-up procedure. If the meter is operating normally, continue the start-up procedure.
6. Once the meter is operating smoothly, slowly open the inlet valve to the full open position.

5.3.2 Meter Start-Up for Meter Sets With a By-Pass

1. Slowly open the downstream valve of the bypass by cracking open the valve for a few seconds and slowly opening the valve to 1/4 open over a period of ten seconds. This will pressurize the meter.

   Important: Do not exceed 5 psig/second maximum when pressurizing the meter. Rapid pressurization can cause an over-speed condition which may damage the meter. Resulting damage is not covered by warranty.
2. After the meter is pressurized, follow your company's authorized procedures or common industry practices to leak test the meter and all pipe connections. Soapy water, Snoop® or gas analyzers are commonly used for this procedure. The D800 also incorporates a leak test feature as described in Section 5.4.
3. If a leak is detected, turn the gas off by slowly closing the downstream gas valve. Make the necessary adjustments to stop the leakage and repeat the meter start-up procedure. If no leaks are detected, continue the start-up procedure.

WARNING

Before making adjustments or working on the meter, slowly depressurize and vent all pressure from the meter set in accordance to company procedures or industry guidelines.

4. Crack or partially open the meter inlet valve until the impellers are rotating. Ensure gas is flowing through the meter. Movement of the RPM Wheel indicates impeller rotation. Throttling (slightly closing) the by-pass valve may be necessary to initiate gas flow through the meter.
5. Let the meter operate at low speed for several minutes. Listen closely for unusual scraping or knocking sounds. If unusual sounds are present or the RPM Wheel is not turning, shut off the gas flow to the meter by first closing the inlet valve and then the outlet valve. After making the necessary adjustments, repeat the meter start-up procedure. If the meter is operating normally, continue the start-up procedure.
6. Slowly open the meter outlet valve to the fully open position.
7. Slowly open the meter inlet valve to the fully open position.
8. Once the meter is operating smoothly, slowly close the bypass valve to the fully closed position.

5.4 Downstream Leak Test Procedures

A common industry practice is to perform a leak test on a meter set after a meter installation. The leak test features on the D800 provide a means of detecting a leak (or gas flow) at any point downstream of the meter cartridge.

WARNING

When performing a downstream leak test, adhere to Federal, State, Company and Local codes and procedures, as applicable.

There are two methods of performing this test, the RPM Wheel Method, and the electronic method using the LCD screens.

5.4.1. Black and White RPM Wheel Method

1. Perform a visual test by looking at the black and white RPM wheel on the meter and ensure it is not rotating as shown in Figure 5.6.

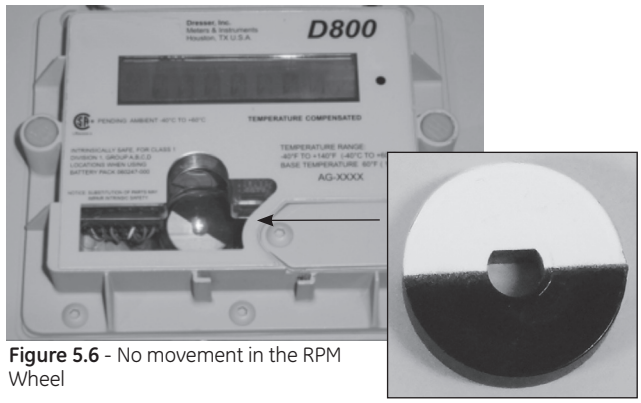


Figure 5.6 - No movement in the RPM Wheel

2. If the RPM Wheel is rotating, gas is flowing downstream of the meter indicating a leak (gas flow). The RPM wheel is tied directly to the meter impellers and is therefore extremely sensitive to flow. Each revolution of the RPM Wheel equates to a measured volume of 0.007407 cubic feet (0.0002098 cubic meters) of gas. In comparison, one revolution of the 1/4 ft test hand on a Class 800 meter with a mechanical index is equivalent to 33.75 revolutions of the Dresser D800 RPM Wheel.

5.4.2. Electronic Method – Magnetic Interface

If the electronic leak test feature is enabled on the D800, the "LEAKTEST" screen will appear on the display when scrolling. If disabled, use the Dresser MeterWare software to enable the test feature. Refer to the MeterWare manual for additional information.

1. Using the magnet provided in the communications kit, scroll though the LCD screens until LEAKTEST appears on the LCD screen, as shown in Figure 5.7.

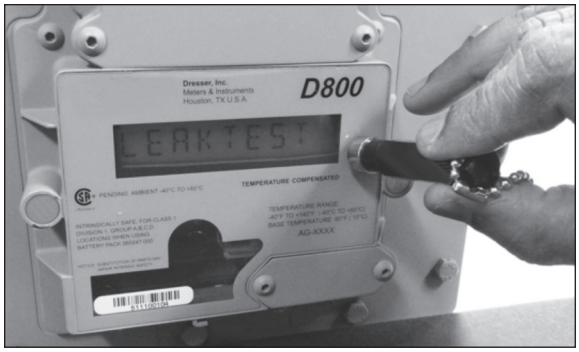


Figure 5.7 - Scroll to LEAKTEST screen

2. Hold the magnet on the black dot for 5 seconds until next screen appears and then remove.
3. Leak Test Run screen will appear as shown in Figure 5.8. The leak test procedure will now begin.

   Note: The meter will use a preconfigured test sequence to run the leak test based on acceptable flow/volume limits and time duration. Use Dresser MeterWare to change these parameters. The default is a maximum flow rate of 0.5 cf/hr with a test duration of two (2) minutes.

Figure 5.8 - Leak Test Run Screen

4. Once the leak test procedure is finished, you will see either a Leak Test Pass Screen as shown in Figure 5.9 or a Leak Test Fail Screen as shown in Figure 5.10.

Figure 5.9 - Leak Test Pass Screen

Figure 5.10 - Leak Test Fail Screen

5. The D800 will hold the leak test result for 24 hours. To repeat the leak test, first clear the screen by displaying the leak test result and holding the magnet on the black dot next to the display screen. The screen will then return to the Leak Test run screen as shown above.

5.4.3. Electronic Method – MeterWare Interface

1. The Leak Test feature is also accessible through the "Advanced" screen of the Dresser MeterWare software as shown in Figure 5.11. This method requires the user to connect to the D800 using the IR communication cable.
2. Using Dresser MeterWare allows the operator to both run the leak test as well as adjusting the test parameters as shown in Figure 5.12. After testing, a PASS or FAIL notification is provided on both the computer screen as shown in Figure 5.13 and on the D800 meter as described in the magnetic interface section above.
3. Refer to the Dresser MeterWare manual for additional instructions on running a leak test using the MeterWare interface.

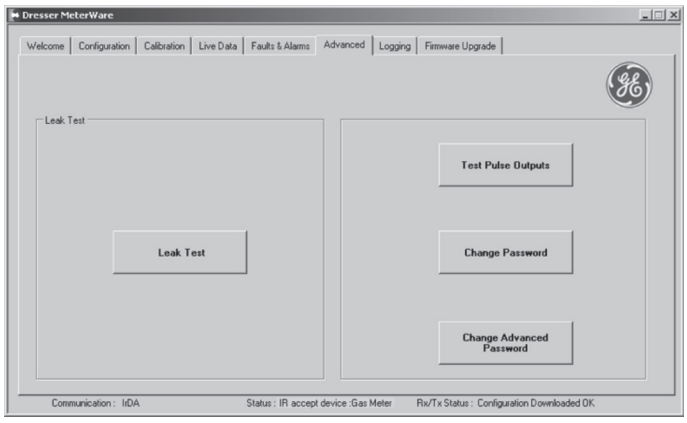


Figure 5.11 - "Advanced" screen of the Dresser MeterWare software

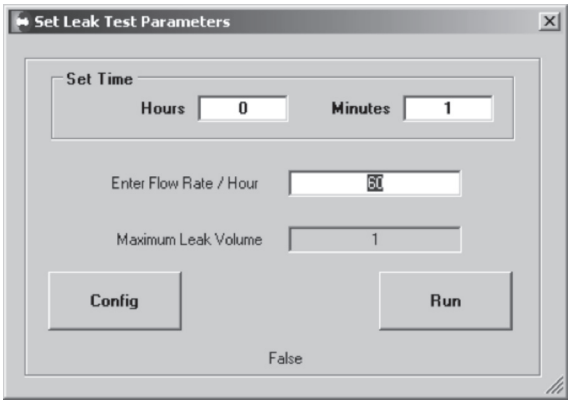


Figure 5.12 - Dresser MeterWare configuration screen for the downstream leak test

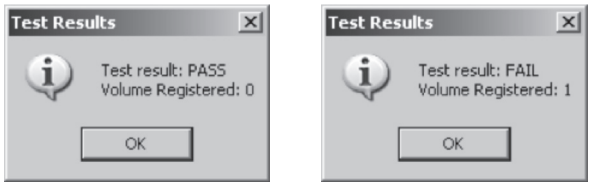


Figure 5.13 - Leak Test Pass/Fail indications in MeterWare

6. Dresser MeterWare Overview

Dresser MeterWare is the computer software which connects your computer to the D800 Meter. The software provides the capability to configure the D800, as well as download logged data and update the D800 firmware. An infrared cable using the IrDA protocol connects the MeterWare to the D800.

Once MeterWare is connected to the D800, a Live Data screen displays current operating conditions. The Volume Configuration screen provides the ability to adjust volume information, such as odometer readings and pulse output configurations. Also, Faults and Alarms are configurable and the screens that are displayed on the D800 Liquid Crystal Display (LCD) are selectable.

For detailed information on the installation and operation of the MeterWare user terminal interface, consult the MeterWare User Manual.

7. Pulse Output Connections

7.1.1 Meter Configuration

Each Dresser D800 meter comes standard with two (2) low frequency pulse outputs (Pulse Outputs 1 and 2) representing volumetric information for remote data collection. Pulse Output 3 is reserved for fault and alarm signals.

The pulse output cable is routed through a cable gland located at the back of the meter. The output location is recessed and covered by a protective plate as shown in Figure 7.1.

Figure 7.1 - Pulse output cable is covered by a protective plate

Using the Dresser MeterWare software, the Corrector pulse output allocation is configured in the Volume configuration screen, as shown in Figure 7.2. Refer to this screen to verify proper configuration. Refer to the MeterWare Manual for complete operating instructions.

Note: Some customers will have their D800 meter configured by the factory. Verify your company policy prior to making any configuration changes.

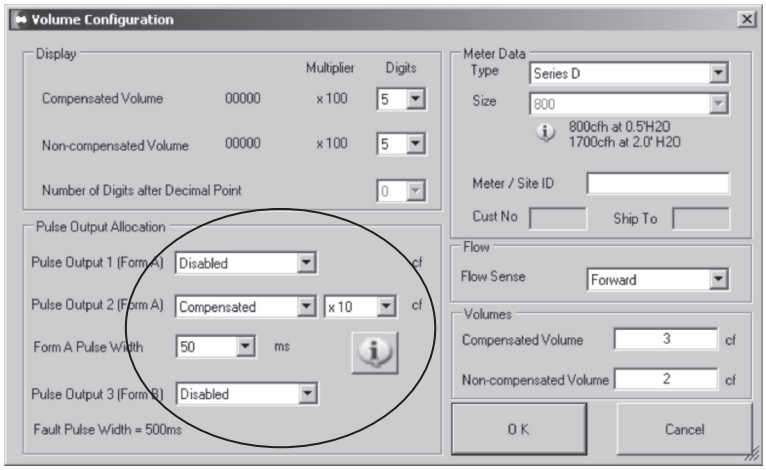


Figure 7.2 - Volume Configuration screen in Dresser MeterWare

To ensure that your pulse outputs are properly wired, the MeterWare software has a test function available on the **Advanced** screen, as shown in Figure 7.3.

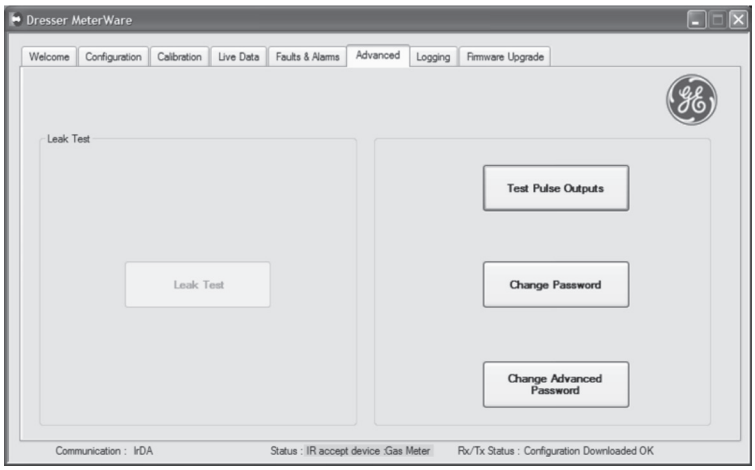


Figure 7.3 - Advanced Screen in MeterWare Software

WARNING

Products certified as intrinsically safe installations shall be:

- **Installed, put into service, used and maintained in compliance with national and local regulations and in accordance with the recommendations contained in the relevant standards concerning potentially explosive atmospheres.**
- **Used only in situations complying with the certification conditions shown in this document and after verification of their compatibility with the zone of intended use and the permitted maximum ambient temperature.**
- **Installed, put into service and maintained by qualified and competent professionals who have undergone suitable training for instrumentation used in areas with potentially explosive atmospheres.**

Once you click the **Test Pulse Outputs** button, a screen will appear as shown in Figure 7.4. Click Yes to proceed with the pulse output test. For further information, refer to the MeterWare Manual.

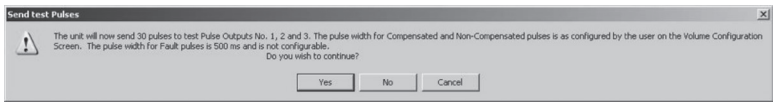

Send test Pulses
The unit will now send 30 pulses to test Pulse Outputs No. 1, 2 and 3. The pulse width for Compensated and Non-Compensated pulses is as configured by the user on the Volume Configuration Screen. The pulse width for Fault pulses is 500 ms and is not configurable.
Do you wish to continue?
Yes
No
Cancel

Figure 7.4 - Send test Pulses screen in Dresser MeterWare

Note: For more information on configuring and testing pulse outputs, consult the Dresser MeterWare manual.

7.2 Pulse Output Wiring Instructions for Hazardous Locations

To maintain compliance with CSA certification, use a suitable Intrinsic Safety barrier for a Class 1 hazardous area for groups A, B, C and D:

1. Do not exceed the following input values for the barrier device:
   a. Vi=8.2V b. Ii=1.5ma
2. The OUTPUT and power handling capability of a barrier should not exceed:
   a. Vout=30V b. Iout=50ma

For hazardous areas, use a recommended barrier such as Turck Brand IM1-12EX-T Single Channel or IM1-22 EX-R Dual Channel Barrier or an equivalent.

WARNING

Ensure properly licensed/trained professionals are used to install equipment if installed in hazardous locations containing explosive atmospheres. All local codes and standards shall be maintained during installation.

A wiring output guide is conveniently located on the cover plate located at the back of the meter as shown in Figure 7.5 This information is also contained in Table 1. For wiring products in hazardous locations, refer to the wiring guide in Figure 7.6.

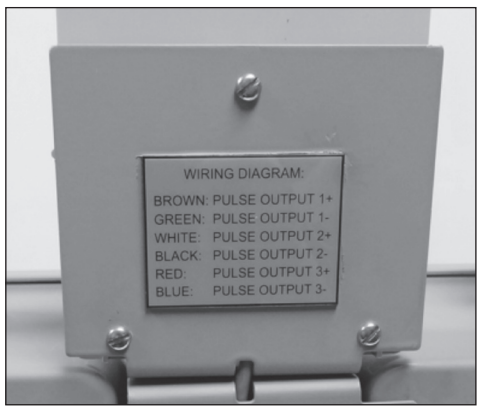


Figure 7.5 - Coverplate with wiring guide

Table 1 - Pulse Output Cable

Output	Name	Wire Color	Pulse Type
Pulse Output 1 (+)	PO1 (+)	Brown	Form A
Pulse Output 1 (-)	PO1 (-)	Green	
Pulse Output 2 (+)	PO2 (+)	White	Form A
Pulse Output 2 (-)	PO2 (-)	Black	
Pulse Output 3 (+)	PO3 (+)	Red	Form B
Pulse Output 3 (-)	PO3 (-)	Blue	
Drain	(Drain)	Bare Wire	

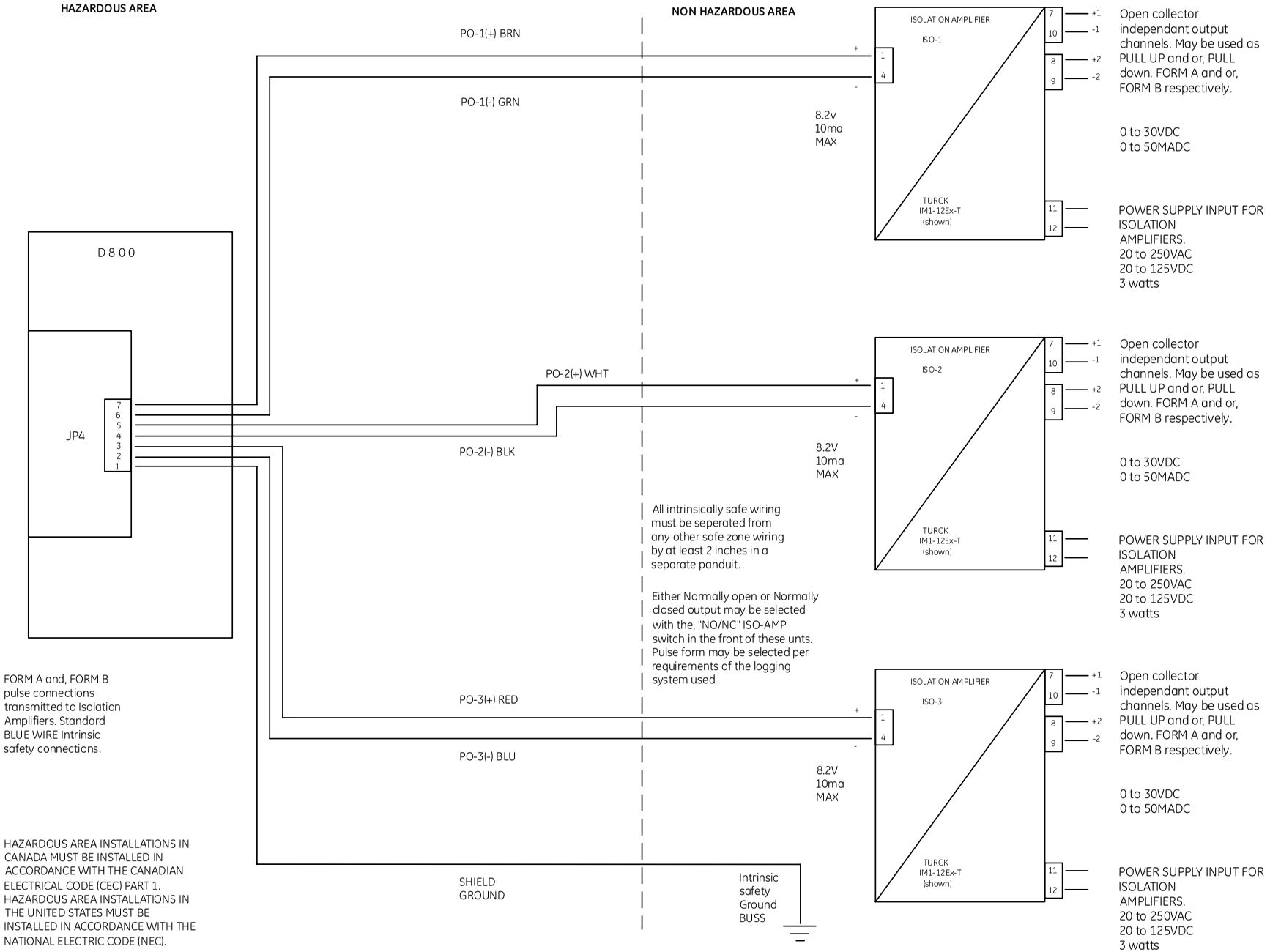

HAZARDOUS AREA
NON HAZARDOUS AREA
PO-1(+) BRN
PO-1(-) GRN
8.2v
10ma
MAX
ISOLATION AMPLIFIER
ISO-1
TURCK
IM1-12Ex-T
(shown)
Open collector independant output channels. May be used as PULL UP and or, PULL down. FORM A and or, FORM B respectively.
0 to 30VDC
0 to 50MADC
POWER SUPPLY INPUT FOR ISOLATION AMPLIFIERS.
20 to 250VAC
20 to 125VDC
3 watts
D 8 0 0
JP4
PO-2(+) WHT
PO-2(-) BLK
8.2V
10ma
MAX
ISOLATION AMPLIFIER
ISO-2
All intrinsically safe wiring must be seperated from any other safe zone wiring by at least 2 inches in a separate panduit.
Either Normally open or Normally closed output may be selected with the, "NO/NC" ISO-AMP switch in the front of these unts. Pulse form may be selected per requirements of the logging system used.
FORM A and, FORM B pulse connections transmitted to Isolation Amplifiers. Standard BLUE WIRE Intrinsic safety connections.
PO-3(+) RED
PO-3(-) BLU
8.2V
10ma
MAX
ISOLATION AMPLIFIER
ISO-3
SHIELD
GROUND
Intrinsic safety Ground BUSS
HAZARDOUS AREA INSTALLATIONS IN CANADA MUST BE INSTALLED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (CEC) PART 1.
HAZARDOUS AREA INSTALLATIONS IN THE UNITED STATES MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC).

Figure 7.6 - Wiring diagram for hazardous locations

7.3 AMR Bracket and Cable Preparation

1. If an AMR is not factory installed the AMR mounting brackets will be attached as shown. Reference Figure 7.7 below. Remove the brackets to begin the installation.

Figure 7.7 - AMR mounting brackets as shipped from factory

2. Once you remove the brackets the pulse output cable will be visible as shown in Figure 7.8.

Figure 7.8- Pulse output cable on backside of meter

3. Loosen the cable gland and pull on the cable till at least 7.5-8" of cable extends out of the cable gland as shown in Figure 7.9. Retighten the cable gland, **hand-tight only**.

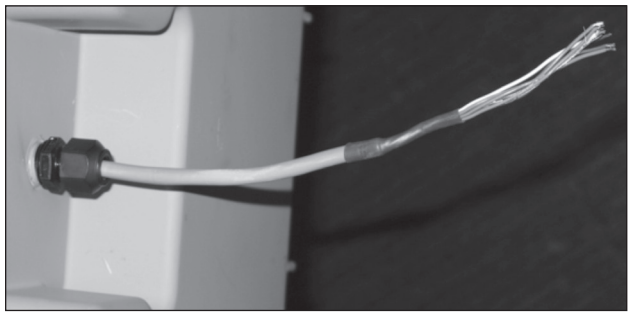


Figure 7.9 - Loosen cable gland and extend the cable out of the gland

4. Flip one bracket over as shown in Figure 7.10 and feed the cable through the holes located at the bend of the mounting brackets. Refasten the brackets to the meter as shown in Figure 7.11.

Figure 7.10 -Properly positioned mounting bracket

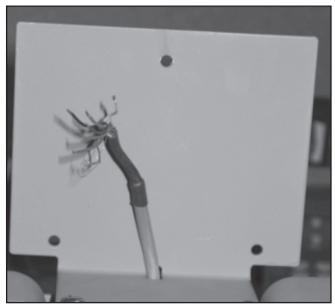


Figure 7.11 -Pull cable through the center hole

8. Reference Materials

Consult the D800 Installation, Maintenance and Operation (IOM) and MeterWare manual for complete information.

- GEA19694 IOM:D800
- GEA19857 Dresser MeterWare Software Manual

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